

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT


(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PCT/98-34	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US00/01432	International filing date (day/month/year) 21 JANUARY 2000	Priority date (day/month/year) NONE
International Patent Classification (IPC) or national classification and IPC IPC(7): B05D 5/12 and US Cl.: 427/226, 229		
Applicant MIDWEST RESEARCH INSTITUTE		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets.
- ☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority. (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).
- These annexes consist of a total of 1 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of report with regard to novelty, inventive step or industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 29 JUNE 2000	Date of completion of this report 28 DECEMBER 2000
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	Authorized officer  MICHAEL CLEVELAND
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I. Basis of the report**1. With regard to the elements of the international application:***☐ the international application as originally filed☒ the description:

pages _____ (See Attached)

, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

☒ the claims:

pages _____ (See Attached)

, as originally filed

pages _____, as amended (together with any statement) under Article 19

pages _____, filed with the demand

pages _____, filed with the letter of _____

☒ the drawings:

pages _____ (See Attached)

, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

☒ the sequence listing part of the description:

pages _____ (See Attached)

, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).☐ the language of publication of the international application (under Rule 48.3(b)).☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).**3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:**☐ contained in the international application in printed form.☐ filed together with the international application in computer readable form.☐ furnished subsequently to this Authority in written form.☐ furnished subsequently to this Authority in computer readable form.☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.**4. ☒ The amendments have resulted in the cancellation of:**☒ the description, pages _____ NONE☒ the claims, Nos. _____ 16-17☒ the drawings, sheets/fig _____ NONE**5. ☐ This report has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).****

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

**Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. statement**

Novelty (N)	Claims <u>3, 6-8, 11, 14-15</u>	YES
	Claims <u>1-2, 4-5, 9-10, 12-13</u>	NO
Inventive Step (IS)	Claims <u>NONE</u>	YES
	Claims <u>1-15</u>	NO
Industrial Applicability (IA)	Claims <u>1-15</u>	YES
	Claims <u>NONE</u>	NO

2. citations and explanations (Rule 70.7)

Claims 1-2, 4-5, 9-10, and 12-13 lack novelty under PCT Article 33(2) as being anticipated by Kydd (U.S. Patent 5,882,722, hereafter '722).

'722 teaches that metal particles and metal chelates are mixed in a solvent, deposited on a substrate, and decomposed by heating (i.e., annealing) to promote consolidation and bond to the substrate to form a conductor (Abstract, Example 1). The mean particle diameter may be about 10 nm (col. 9, lines 4-11). The particles may be nickel (e.g., col. 8, lines 54-56). Typical chelates are carboxylates (col. 8, lines 26-43).

Claims 1-2, 4-5, 9-10, and 12-13 lack novelty under PCT Article 33(2) as being anticipated by Noguchi et al. (U.S. Patent 5,597,614, hereafter '614).

'614 teaches depositing metal particles (such as nickel, col. 4, lines 13-20) and a fixation component including metal chelates (col. 6, lines 23-41) in an organic solvent, and firing (i.e., annealing) to produce a consolidated conducting film (Abstract). The ultrafine particles are preferably as small as 1 nanometer (col. 4, lines 29-31). Conductive properties of the formed films are demonstrated at col. 9, lines 6-26 and Figs. 7-9.

Claims 3, 6, and 11 lack an inventive step under PCT Article 33(3) as being obvious over Kydd '722. Kydd does not teach that heating is by photolytic action, nor a ZnO substrate. However, photolytic action (such as exposure to infrared light) is a well-known heating technique. The method of Kydd appears to be applicable to any desired substrate.

Claims 7-8 and 14-15 lack an inventive step under PCT Article 33(3) as being obvious over Kydd '722 in view of Takakura et al. (U.S. Patent 4,666,742, hereafter '742). Kydd '722 does not teach the use of nickel cyclooctadiene. However, cyclooctadienes are known as chelates for metal decomposition compounds, as demonstrated by '742, col. 4, lines 23-57. Therefore, it would have been obvious to one of ordinary skill in the art to use an (Continued on Supplemental Sheet.)

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 10

I. BASIS OF REPORT:

This report has been drawn on the basis of the description,
page(s) 1-4, as originally filed.
page(s) NONE, filed with the demand.
and additional amendments:
NONE

This report has been drawn on the basis of the claims,
page(s) NONE, as originally filed.
page(s) 5-6, as amended under Article 19.
page(s) NONE, filed with the demand.
and additional amendments:
Page 5, filed with the letter of 30 November 2000.

This report has been drawn on the basis of the drawings,
page(s) 1, as originally filed.
page(s) NONE, filed with the demand.
and additional amendments:
NONE

This report has been drawn on the basis of the sequence listing part of the description:
page(s) NONE, as originally filed.
pages(s) NONE, filed with the demand.
and additional amendments:
NONE

V. 2. REASONED STATEMENTS - CITATIONS AND EXPLANATIONS (Continued):

nickel cyclooctadiene as the chelate of '722 with the expectation of similar results. Further, time, temperature, and particle diameter are known result-effective variables for the process ('722, Abstract). The disclosed ranges of time, temperature, and particle diameter overlap those claimed by Applicant.

Claims 1-15 have industrial applicability because they can be used to produce conductive films useful in electronic components.

----- NEW CITATIONS -----

US 4,666,742 A (TAKAKURA et al) 19 MAY 1987, see col. 4, lines 23-57.